Instructions

200 SERIES RESISTANCE-TUNED OSCILLATORS

The 200 series Resistance-tuned Oscillators includes the Model 200A with a frequency range of 35 cps to 35,000 cps and 1 watt output, the Model 200B with a frequency range of 20 cps to 20,000 cps and 1 watt output, the Model 200C with a frequency range of 20 cps to 200 KC and 100 milliwatts output, and the Model 200D with a frequency range of 7 cps to 70 KC and 100 milliwatts output. These units consist of an oscillator section and a power amplifier section with the necessary voltage supplies.

DESCRIPTION

1-1 General: The oscillator section is a two stage resistance-coupled amplifier over which both positive and negative feedback are applied. The positive feedback network is a frequency selective, resistance condenser combination which is used to control the frequency of oscillation. Negative feedback is used to stabilize the operation of the circuit. The amount of negative feedback is determined by a resistance network, one element of which is non-linear. This element controls the amount of feedback in accordance with the amplitude of oscillation and consequently maintains the proper operating point in the system.

1-2 Output Amplifier Models 200A and 200B: The Models 200A and 200B have a two stage power amplifier with a transformer-coupled output following the oscillator section. Feedback is used in the power amplifier to eliminate distortion and to provide good frequency response. This amplifier is designed to deliver 1 watt of audio power into a 500 ohm resistance load over the major portion of the frequency range. Special output impedances are supplied on order and in this case the output impedance is marked on the panel of the instrument.

The internal impedance of the output system is approximately 50 ohms so the output voltage is not critical with load resistance. A load resistance of 600 ohms may be used with only small loss in available power. A load resistance less than 500 ohms, however, will cause an abnormal drop in output voltage at frequencies above 10,000 cps.

1-3 Output Amplifier Models 200C and 200D: The Models 200C and 200D have a two stage resistance-coupled output amplifier. Feedback is used in this amplifier to eliminate distortion and to provide a good frequency response over the wide frequency range. This amplifier is designed to deliver 100 milliwatts into a 1000 ohm resistance load over the major portion of the frequency range. The internal impedance of this amplifier is approximately 50 ohms at 400 cps and therefore the output is not critical with load. Load resistances less than 1000 ohms will tend to increase the distortion at full output but otherwise will not affect the operation.

OPERATING INSTRUCTIONS

2-1 Initial Adjustments: This oscillator has been carefully tested and adjusted before leaving the factory and no further adjustments should be necessary. Before turning on the power the unit should be checked to make sure the tubes are secure in their sockets and the Mazda lamp is screwed in tightly. Ordinarily a warm-up period is not required. However, when the unit is first put into operation or when it has been standing idle for a long time the oscillator should be allowed to run for ten or fifteen minutes before it is used.

2-2 Frequency: The main dial located in the center of the panel is calibrated directly in cycles per second for the lowest frequency range. The reading of this dial is multiplied by the factor indicated on the range switch at the left side of the panel.

2-3 Output: The output voltage is controlled by the amplitude control at the right side of the panel. This control is ahead of the output amplifier. When very small audio voltages are required it is good practice to use an attenuator between the oscillator and the equipment being driven. This will help keep the hum level far enough below the audio signal.

The oscillator has been adjusted to deliver more than rated power into the load. Because of this adjustment the output wave may show some distortion when the amplitude control is open. This condition is normal and when low distortion is required the oscillator should be operated at rated output or slightly below.

2-4 Power Supply: The oscillator is designed to operate on 115 volts, 50-60 cps.

MAINTENANCE

3-1 General: For proper operation both the frequency calibration and the distortion level in the output should be periodically checked. Also the unit should be thoroughly cleaned and a drop of light oil should be applied to the bearing on the main dial shaft.

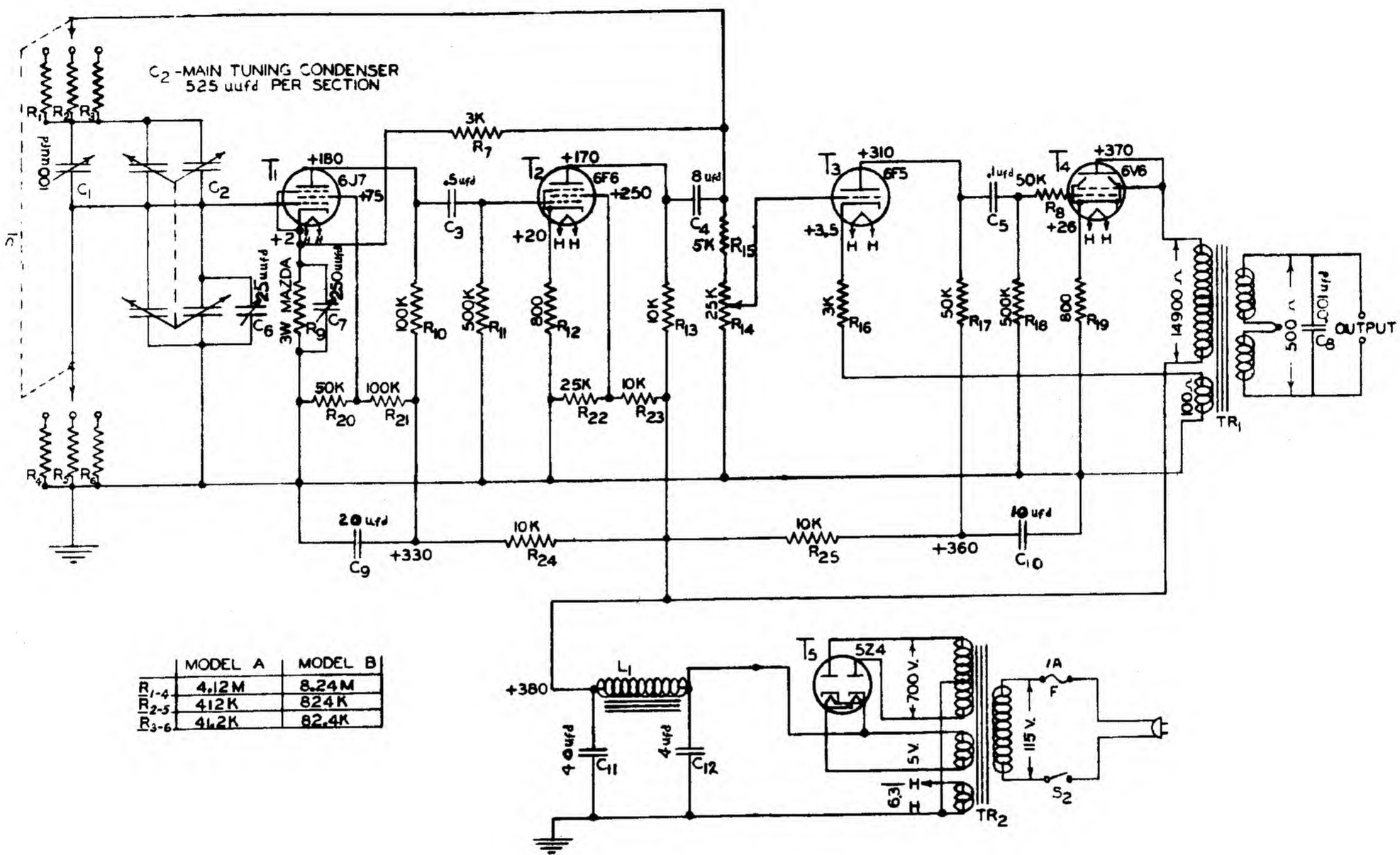
3-2 Calibration: The tracking of the main frequency selecting dial is adjusted by means of the padding condenser C1. For this adjustment set the range switch at X10 and reset the dial to a known frequency between 200 and 400 cps. The dial may be moved on the shaft by loosening the set-screws in the flexible coupling if this adjustment is necessary. Then turn the main dial to the high frequency end and adjust C1 to set the dial calibration at the proper frequency. If some standard of frequency is not available this adjustment may be made by connecting a voltmeter or an oscilloscope to the output and adjusting C1 until the output voltage is constant over the entire X10 range.

The tracking from range to range is determined by the resistor set S1. These resistors should not be adjusted, but if the tracking from range to range is in error a new resistor set may be obtained by writing directly to the factory and giving the serial number of the instrument.

3-3 Distortion: The total harmonic distortion will be less than one-half of 1 percent when the instrument is operating properly. If tubes are changed the distortion should be measured if possible, because a poor tube will increase the distortion without otherwise affecting the operation of the instrument. Instability of the output voltage is sometimes caused by a defective tube in the oscillator section T1 or T2 or by a defective coupling condenser which places a positive voltage on the grid of T2.

On the following pages the circuit diagrams are shown for reference.

WIRING DIAGRAM MODELS 200-A-B

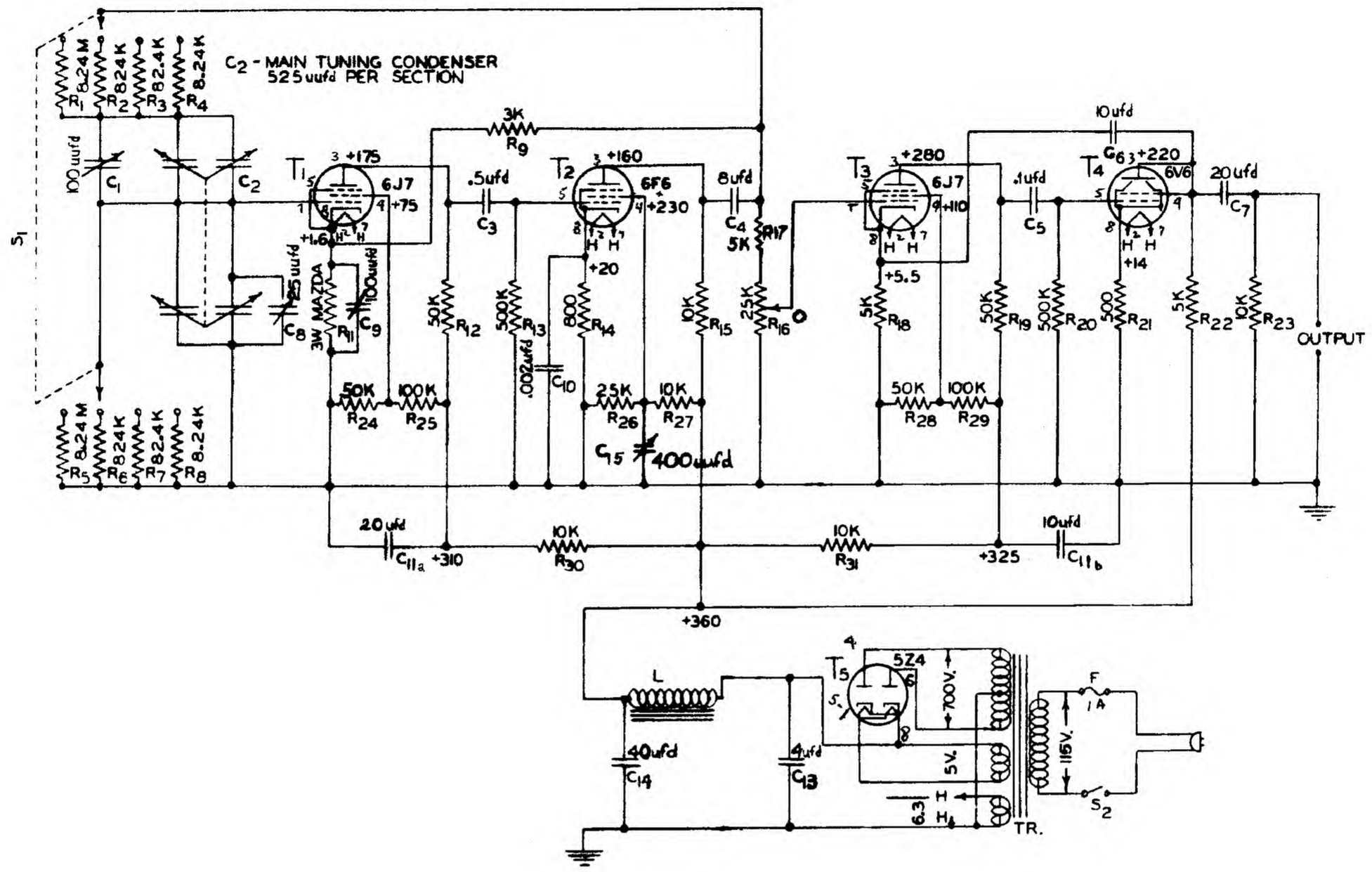


	MODEL A	MODEL B
$R_{1\text{-}4}$	4.12M	8.24M
$R_{2\text{-}5}$	412K	824K
$R_{3\text{-}6}$	41.2K	82.4K

CIRCUIT CONSTANTS
Model 200-A and 200-B

R1, R2, R3	Frequency determining resistors
R4, R5, R6	Frequency determining resistors
R7	3000 ohms
R8	50,000 ohms
R9	Amplitude control resistor
R10	100,000 ohms
R11	500,000 ohms
R12	800 ohms
R13	10,000 ohms
R14	25,000 ohms
R15	5000 ohms
R16	3000 ohms
R17	50,000 ohms
R18	500,000 ohms
R19	800 ohms
R20	50,000 ohms
R21	100,000 ohms
R22	25,000 ohms
R23	10,000 ohms
R24	10,000 ohms
R25	10,000 ohms
C1	Padding condenser
C2	Main tuning condenser
C3	O.5 ufd. paper
C4	8 ufd. paper
C5	0.1 ufd. paper
C6	50 uufd. 200A—25 uufd.—200B
C7	0.00025 ufd. mica
C8	0.001 ufd. paper
C9	20 ufd. electrolytic
C10	10 ufd. electrolytic
C11	40 ufd. electrolytic
C12	4 ufd.
T1	6J7 metal
T2	6F6 metal
T3	6F5 metal or glass
T4	6V6 metal or glass
T5	5Z4 metal or 5Y3G
Tr1	Output transformer
Tr2	Power transformer
L1	Filter choke

WIRING DIAGRAM MODEL 200-C



CIRCUIT CONSTANTS
Model 200-C

R1, R2, R3, R4	Frequency determining resistors
R5, R6, R7, R8	Frequency determining resistors
R9	3000 ohms
R11	Amplitude control resistor
R12	50,000 ohms
R13	500,000 ohms
R14	800 ohms
R15	10,000 ohms
R16	25,000 ohms
R17	5000 ohms
R18	5000 ohms
R19	50,000 ohms
R20	500,000 ohms
R21	500 ohms
R22	5000 ohms
R23	10,000 ohms
R24	50,000 ohms
R25	100,000 ohms
R26	25,000 ohms
R27	10,000 ohms
R28	50,000 ohms
R29	100,000 ohms
R30	10,000 ohms
R31	10,000 ohms
C1	Padding condenser
C2	Main tuning condenser
C3	0.5 ufd.
C4	8 ufd.
C5	0.1 ufd.
C6	10 ufd.
C7	20 ufd.
C8	25 uufd.
C9	100 uufd.
C10	.002 ufd.
C11a	20 ufd.
C11b	10 ufd.
C13	4 ufd.
C14	40 ufd.
C15	400 uufd.
T1	6J7 metal
T2	6F6 metal
T3	6J7 metal or glass
T4	6V6 metal or glass
T5	5Z4 metal or 5Y3G
Tr1	Power transformer
L1	Filter choke